

# Long-term Durability of MicroPulse® Laser Therapy for Diabetic Macular Edema in a Noncompliant, Monocular Patient



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I first began using MicroPulse during my fellowship years where I treated patients using the 810 nm and the 577 nm wavelengths. After studying and seeing the clinical benefits, I was determined to have this modality available in my own practice. In trying to determine the most optimal laser delivery system, I spoke with other renowned physicians who found tremendous benefit to using the 532 nm wavelength. The IRIDEX IQ 532 offered me the most versatility to treat effectively in the traditional continuous-wave and MicroPulse modes. In my experience using all three wavelengths for MicroPulse, I have found them equivalent in terms of safety and clinical efficacy in the treatment of retinal disorders.

Even though MicroPulse has been shown to produce results equivalent or superior to traditional thermal photocoagulation, but with the added benefit of no detectable tissue damage,<sup>1</sup> I used the treatment conservatively at first, treating only outside the fovea. However, after seeing no tissue damage throughout follow-up in the eyes of my first MicroPulse patients, I began treating the fovea in all disease states that included center-involving edema.

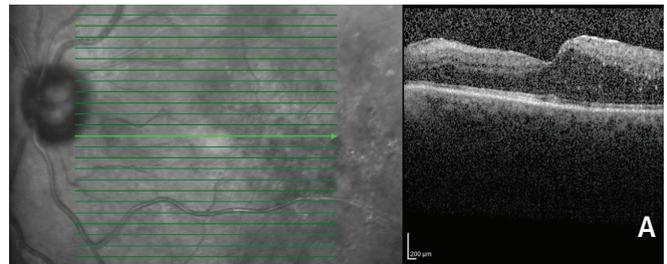
Today, I use MicroPulse as a monotherapy and as an adjunct to other treatment regimens for several retinal diseases and conditions, including diabetic macular edema (DME), central serous retinopathy, juxtafoveal telangiectasia and macular edema associated with retinal vein occlusions. I have found that all of these disease entities are amenable to MicroPulse treatment, and that the duration of effect can be quite long, as the following case illustrates.

## PATIENT HISTORY

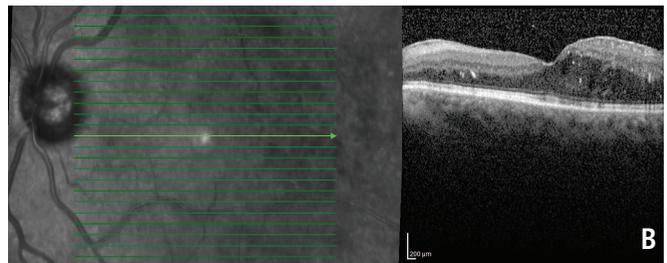
The patient, a 68-year-old Hispanic female, had been diagnosed with diabetes more than 25 years ago. She came to my practice with a history of no light perception in her right eye, which had been caused by a failed surgical repair of a proliferative diabetic traction retinal detachment. The left eye had been salvaged with exten-

sive panretinal photocoagulation (PRP) and focal laser treatment.

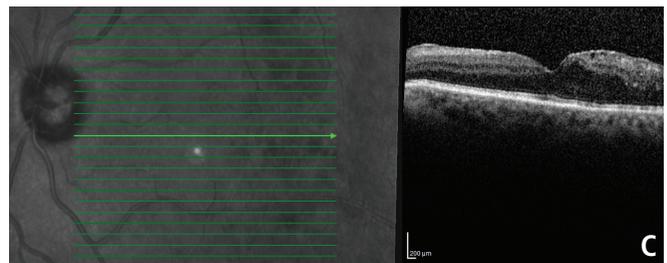
When the patient arrived at my practice on Nov. 8, 2013, she had chronic edema in the left eye with an OCT-measured central foveal thickness (CFT) of 297  $\mu\text{m}$  and maximal retinal thickness (MRT) of 544  $\mu\text{m}$  (**Figure 1A**). Visual acuity (VA) was 20/200 pinholing to 20/80. While the patient could have been treated with an anti-VEGF agent or intravitreal steroid, I recommended MicroPulse because she was monocular. I also explained to the patient that we could add other treatments in the future, if necessary since MicroPulse does not cause damage to the tissue.



**Figure 1A.** Nov. 8, 2013 | prior to MicroPulse | CFT 297  $\mu\text{m}$  MRT 544  $\mu\text{m}$  | VA 20/200, pinhole 20/80 with glasses.



**Figure 1B.** Dec. 26, 2013 | approximately 6 weeks post MicroPulse | CFT 287  $\mu\text{m}$  | MRT 539  $\mu\text{m}$  | VA 20/150, pinhole 20/80 with glasses.



**Figure 1C.** March 2, 2015 | > 1 year post MicroPulse | CFT 227  $\mu\text{m}$  MRT 428  $\mu\text{m}$  | VA 20/150 with subjective improvement.

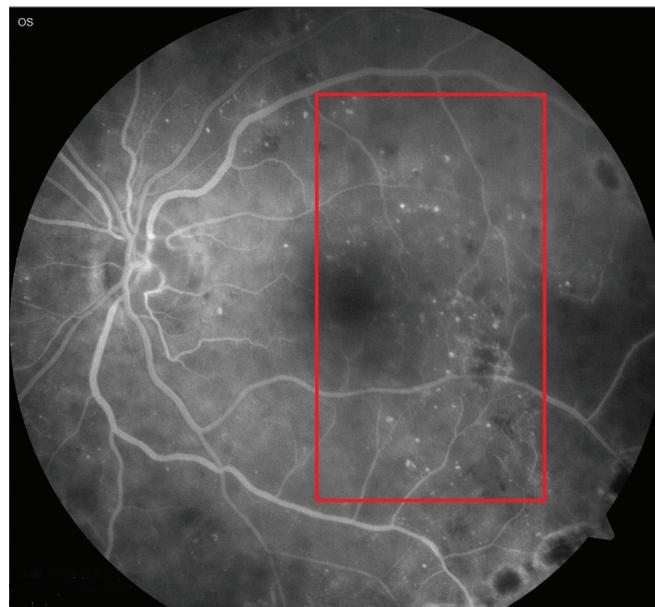
*“MicroPulse had produced a treatment effect that was sustained for nearly a year and a half despite worsening diabetic control.”*

### TREATMENT WITH MICROPULSE

The patient agreed to undergo MicroPulse treatment, which I performed that day. Using the IRIDEX IQ 532 laser set for a 200- $\mu$ m spot size, 400 mW of power, a 200-ms exposure duration and a 5% duty cycle (**Table 1**), I targeted a large area of edema (**Figure 2**), which included the fovea, with 314 confluent spots. I also treated surrounding healthy tissue in an effort to further stimulate anti-angiogenic and restorative intracellular biological factors.

The patient returned for follow-up approximately 6 weeks later on Dec. 26, 2013. Her VA on that day had improved to 20/150. Because very little anatomical change was evident on OCT (**Figure 1B**), an intravitreal injection of bevacizumab (Avastin, Genentech) was given.

The patient was scheduled to return in 4 weeks, but did not keep the appointment. She did not return to the office until more than a year later on March 2, 2015. At that visit, even though her HbA1c level had worsened from 7.6% to 10.2%, CFT had improved to 227  $\mu$ m and MRT had improved to 428  $\mu$ m (**Figure 1C**). Her VA was still 20/150, but she reported subjective vision improvements, noting that she could see the TV more clearly. She also reported that her activities of daily living had



**Figure 2.** Area treated with MicroPulse.

become easier with regard to her sight. MicroPulse had produced a treatment effect that was sustained for nearly a year and a half despite worsening diabetic control.

### TIPS FOR NEW MICROPULSE USERS

Through my experience using MicroPulse, I have learned that there may be a tendency to undertreat at first. Instead, it is better to think of this treatment as PRP for the macula. Placing hundreds of confluent laser spots leads to quality results. Also, although many patients report improved vision by 6 weeks after undergoing MicroPulse therapy, it may take longer for the treatment effects to be seen on OCT. Once they occur, however, the need for supplemental treatment may be reduced or eliminated. Finally, based on the results of a study my colleagues and I conducted, outcomes may be better if CFT is reduced to  $\leq 400 \mu$ m prior to the use of MicroPulse.<sup>2</sup> ■

### REFERENCES

1. Vujosevic S, Bottega E, Casciano M, et al. Microperimetry and fundus autofluorescence in diabetic macular edema: subthreshold micropulse diode laser versus modified early treatment diabetic retinopathy study laser photocoagulation. *Retina*. 2010;30(6):908-916.
2. Mansouri A, Sampat KM, Malik KJ, et al. Efficacy of subthreshold micropulse laser in the treatment of diabetic macular edema is influenced by pre-treatment central foveal thickness. *Eye (Lond)*. 2014;28(12):1418-1424.



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| Table 1. TREATMENT PARAMETERS                                |   |
|--|---|
| IRIDEX IQ 532 Laser with MicroPulse for Center-involving DME |   |
| ■  | Wavelength: 532 nm  |
| ■  | Spot size on slit lamp adapter: 200 $\mu$ m   |
| ■  | Contact lens: Area Centralis (Volk)   |
| ■  | Power: 400 mW   |
| ■  | Exposure duration: 200 ms   |
| ■  | Duty cycle: 5%  |
| ■  | MicroPulse Delivery: 314 confluent spots targeted to a large area of edema, including the fovea |

Treatment techniques and opinions presented in this case report are those of the author. IRIDEX lasers referenced in this case report are cleared for retinal photocoagulation of vascular and structural abnormalities of the retina and choroid; and iridotomy, iridectomy and trabeculoplasty in angle-closure glaucoma and open-angle glaucoma. IRIDEX assumes no responsibility for patient treatment and outcome. IRIDEX, IRIDEX logo, and MicroPulse are registered trademarks, and IQ 532 is a trademark of IRIDEX Corporation.

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